Flexible two-stage turbine bleeding Organic Rankine Cycles (ORCs) for combined heat and power applications


Titel des Beitrags: Flexible two-stage turbine bleeding organic rankine cycles (ORCs) for combined heat and power applications

Abstract: Based on the increasing share of renewable resources on worldwide energy provision and the focus on efficient energy production, heating, cooling or power systems are faced with versatile challenges. In order to increase the profitability and to pave the way for better commercial implementation and market penetration, future energy systems must feature a high level of flexibility to cover wide operating ranges. In this study different combined heat and power configurations based on a two-stage turbine bleeding Organic Rankine Cycle are investigated from a thermodynamic point of view. The German VDI standard 4655 for multi-family households is used to define a characteristic annual heat load duration curve with which the system performances are evaluated. Benchmark parameters are generated electricity, produced energy, mean overall exergy efficiencies and primary energy savings according to EU standard 2012/27/EU. The results show that the proposed flexible plant schemes increase the thermodynamic and environmental related performance compared to a reference process.

Stichworte:
Annual energy generation, Combined heat and power, Organic rankine cycle, Primary energy savings.

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